Prioritized Technology:
Instruments to Identify Microscopic Organisms in Ocean Worlds

Technical Goals

- Characterize dimension **of 100 cells/mL**; with minimum sizes **≥ 0.2 μm** in size
- Detect organism motility of at least **10×** that of Brownian motion

Technical Status/ SOA

- Europa Lander SDT's requirement was 100 cells/ml; with minimum sizes ≥ 0.2 μm in size
- Best flight-ready confocal microscopes…
- Best flight-ready holographic microscopes…
- Flight-ready environmental electron microscope (MVP-SEM) with 10 nm resolution in PICASSO development for dry sample.
- Atomic force microscope flown on Phoenix imaged 40 μm × 40 μm × 700 nm volume at 100 nm resolution for a dry sample.

Mission Applications

- Identification of structures with dimensions similar to terrestrial microorganisms with observed mobility would be a very strong indicator of life.
- Identification of terrestrial organisms in the sample would be strong indicator of terrestrial contamination.

Vision for the lander on Europa with Jupiter in the background